

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Auvo K. KETTUNEN

Serial No. **09/533,904**

Filed: **March 21, 2000**



Atty. Ref.: **10-1304**

Group: **1731**

Examiner: **Nguyen**

For: **COOKING CELLULOSE MATERIAL USING HIGH
ALKALI CONCENTRATIONS AND/OR HIGH PH NEAR
THE END OF THE COOK**

* * * * *

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Honorable Commissioner of Patents
and Trademarks
Washington, DC 20231

RULE 132 DECLARATION OF C. BERTIL STROMBERG

Sir:

Pursuant to 37 CFR §1.132, the undersigned, **C. Bertil STROMBERG**, hereby declares and states that:

1. I am presently, and for all times relevant to the facts stated herein have been, the Director of Technology at ANDRITZ-AHLSTROM INC. the successor in interest to the assignee of the above-identified reissue application, AHLSTROM MACHINERY INC.
2. On information and belief, I understand that the Examiner in the above-identified reissue application has raised an issue with respect to whether or not cooked wood chips retain their chip-like structure. Specifically, it is my understanding that the Examiner's interpretation of the statement, for

example, at column 10, line 2 of U.S. Patent No. 5,779,856 (on which the subject reissue application is based, and hereinafter referred to as "the '856 patent") that "chip and liquor" are discharged from the impregnation vessel means that no cooking of the chips can occur. As will be demonstrated below, such an interpretation is factually erroneous in that "cooked" chips do retain their chip structures in the absence of mechanical agitation.

3. Under my direction and control, Southern pine chips from a pulp mill in the southeastern United States were cooked in laboratory batch digesters to illustrate the chip form and delignification through a cook. Specifically, three conventional kraft cooks using the same furnish, effective alkali (EA) charge, and temperature profile were completed. One cook was stopped at the end of the impregnation stage, one was stopped at the mid-point at cook temperature, and one was stopped at the normal end of cook.
4. Photographs were made of the chips before cooking, at the end of impregnation, at the mid-point of the cook, and at the end of the cook. Such photographs are attached hereto as FIGURES 1-16 which will be referred to further below.
5. At the end of impregnation, the chips underwent a simulated refining for kappa number analysis. The chips at the mid-point and end of cook were defibred to produce brownstock for kappa number analysis.
6. Cooking was completed in three 5-liter digesters that were electrically heated and temperature controlled by a computer. The liquor and chips were mixed throughout the process by swinging the digesters in a 270° arc. The wood chip charge was 750 grams on an oven-dried basis, and the EA charge was 19.2% as NaOH on wood. The chips were placed in chip baskets and steamed for 15 minutes at 100°C. The chip baskets were then transferred to the digesters. Heating was begun and the

digesters reached the impregnation temperature of 110°C in 15 minutes. The 110°C impregnation temperature was maintained for 30 minutes. One of the cooks was terminated at the end of impregnation. The 168.6°C cooking temperature was reached in 15 minutes. One cook was stopped at 43 minutes (mid-way between the time the cooking temperature was reached and the time to stop the cook for the target kappa number). One cook stayed at the cooking temperature for 87 minutes to reach the end of cook.

7. When the process time was complete for each sample, that digester was moved to a cooling rack where the cooking liquor was circulated through a cold water heat exchanger to stop the chemical reaction. A sample of black liquor was taken, the chips were washed for 10 minutes by displacing water through them, and the chip basket removed from the digester.
8. The impregnated chips were photographed. They were then placed in a centrifuge, washed for 10 minutes, and dewatered for 10 minutes. A 150 gram wet sub-sample was refined and screened for kappa number analysis. The chips at the mid-point and end of cook were photographed. They were then defibered (the fibers separated) by agitation in water. The resultant brownstocks were then placed in a centrifuge, washed for 10 minutes, and dewatered for 10 minutes. A 50 gram wet sub-sample of each brownstock was screened for kappa number analysis. Sub-samples from each process were dried in an oven to determine the solid content. These were used to determine the total yield. The H-factors and Kappa numbers obtained from such laboratory cooks appears below in Table 1.

Table 1. Kappa number change through Laboratory Kraft Cooks

	End of Impregnation	Mid-Point of Cook Zone	End of Cook
H-factor	2	660	1270
Kappa Number	129.3	63.1	32.0

9. The photographs of Figures 1 – 5 depict the state of the wood chips prior to treatment and can be easily compared to the remaining pictures. Alkali was introduced to the wood chips only once during the laboratory treatments described previously and, as such, the effective alkali (EA) decreased throughout the cook.
10. Figures 6 - 8 are photographs of the wood chips after treating for 30 minutes at 110°C (the impregnation stage) where the effective alkali concentration at the beginning of the impregnation stage was 54.9g/l as NaOH.
11. Figures 9 -11 are photographs of the wood chips at the mid-point of the cook, 15 minutes to reach the final cooking temperature of 168.6°C and 43 minutes at the final cooking temperature. The effective alkali concentration was measured as 12.8g/l at the mid-point of the cooking stage.
12. Figures 12 - 14 are photographs of the wood chips at the end of cooking, 87 minutes at the final cook temperature of 168.6°C. The effective alkali concentration of the liquor at the end of the cook was measured as 8.5g/l.
13. The photographs of Figures 15 and 16 show that, after agitation, brownstock or pulp is formed.

14. The evidence provided herewith establishes that cooked wood chips retain their chip-like structures. As such, the statement in the '856 patent regarding a "chip and liquor slurry" appearing, for example at column 10, line 2, does not necessarily mean that such chips in the slurry are uncooked.
15. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully Submitted,

June 18, 2001
Date Signed


C. Bertil STROMBERG



Figure 1. Uncooked Southern pine chips in a chip basket. This may be compared to the chips at the end of impregnation [Fig.6].

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Figure 2. Uncooked Southern pine chips in a chip basket. This may be compared to the chips mid-way through the cook zone [Fig. 9].

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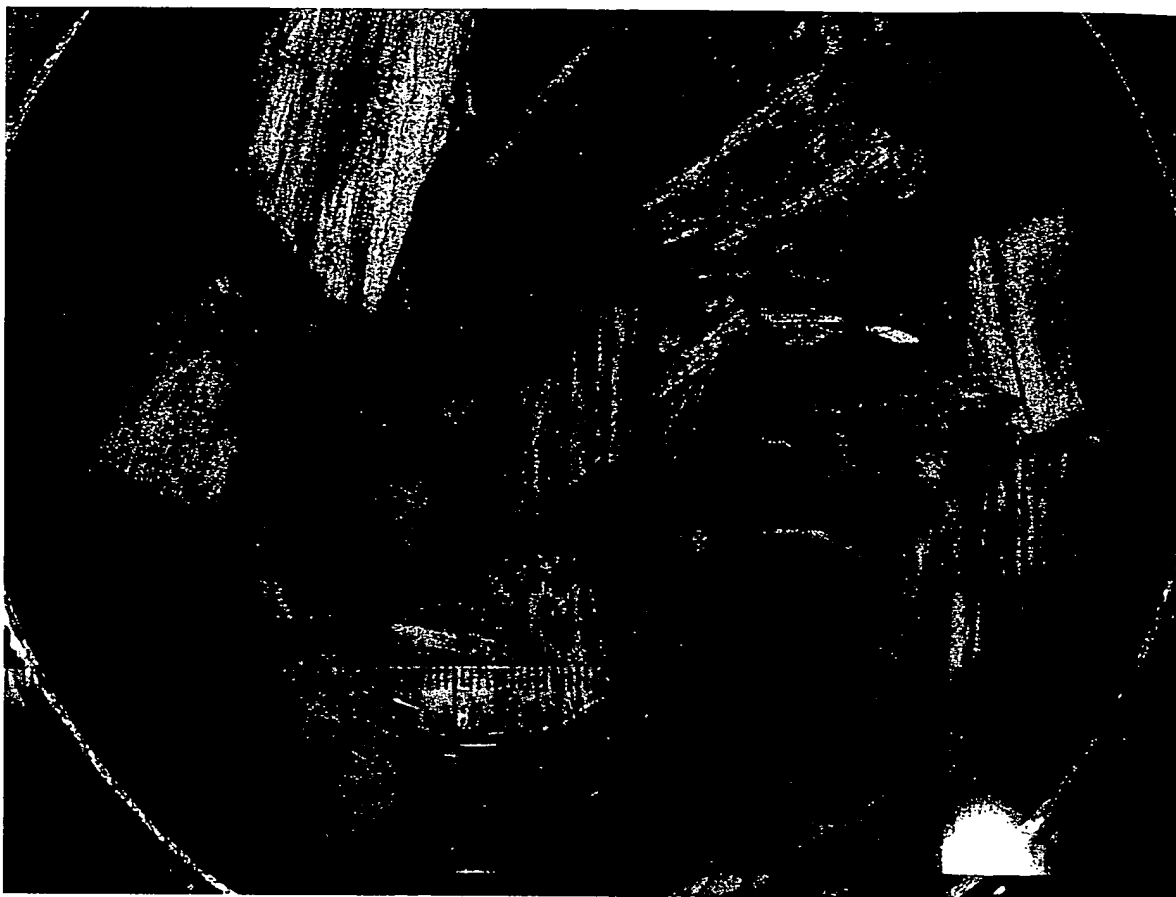


Figure 3. Uncooked Southern pine chips in a chip basket. This may be compared to the chips at the end of cooking [Fig.12].

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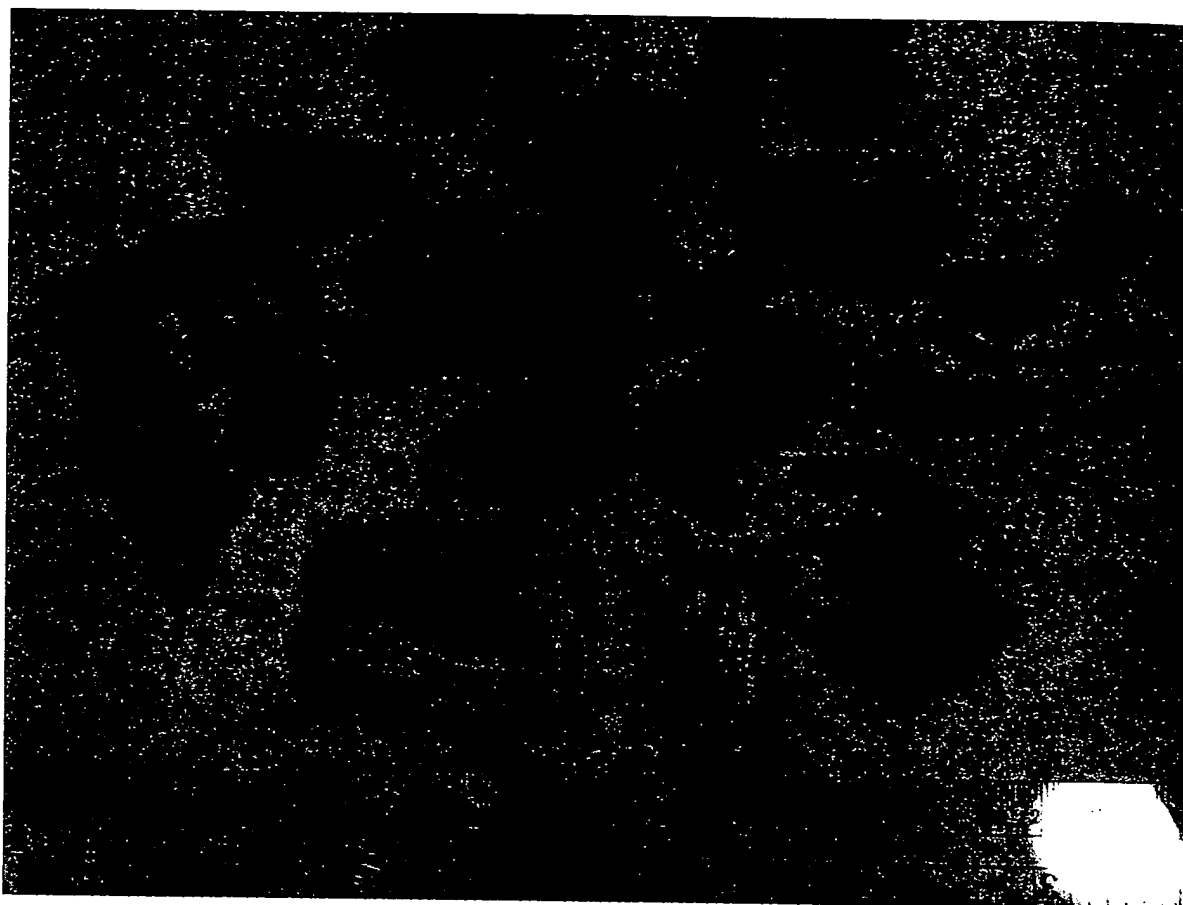


Figure 4. Uncooked Southern pine chips. These may be compared to impregnated chips [Fig.7], chips mid-way through the cook [Fig. 10], and chips at the end of the cook [Fig.13].

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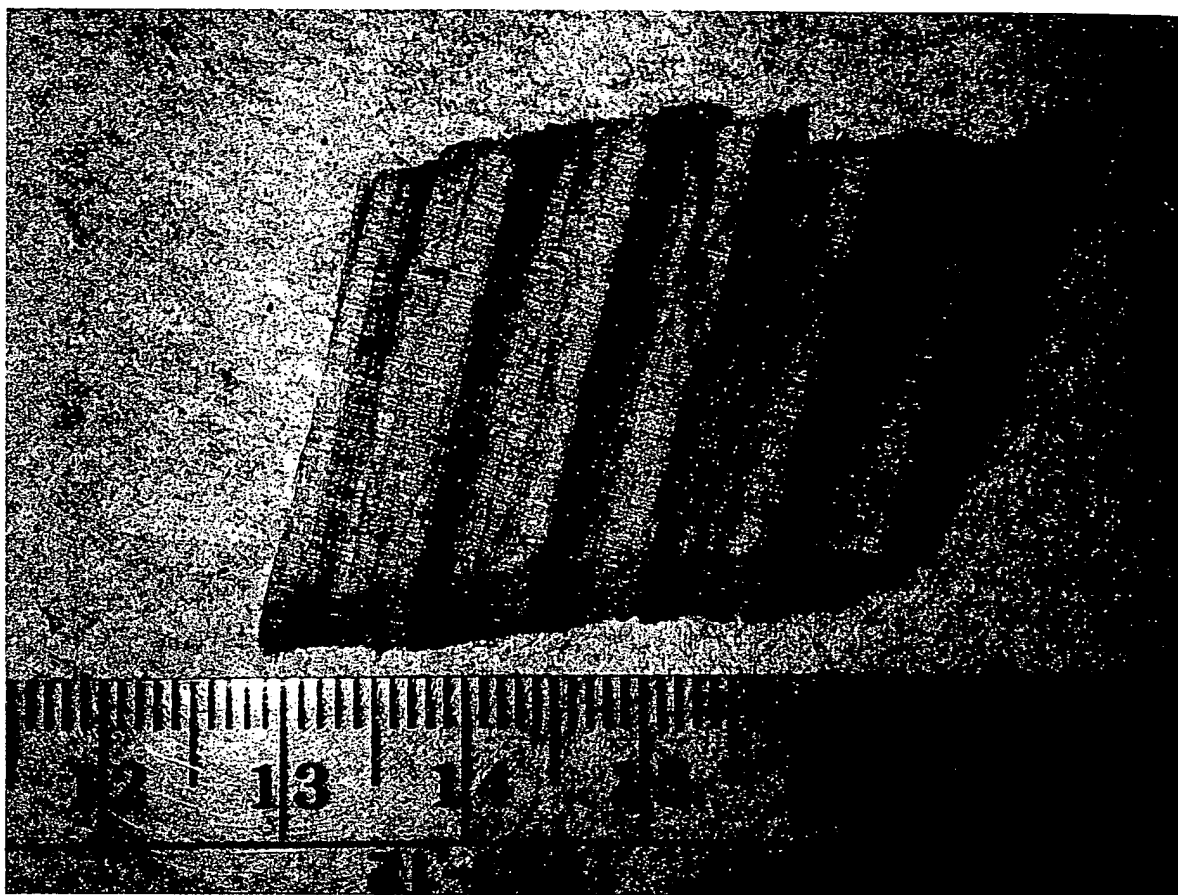


Figure 5. Single uncooked Southern pine chip. This may be compared to an impregnated chip [Fig.8], a chip mid-way through the cook [Fig. 11], and a chip at the end of the cook [Fig.14].

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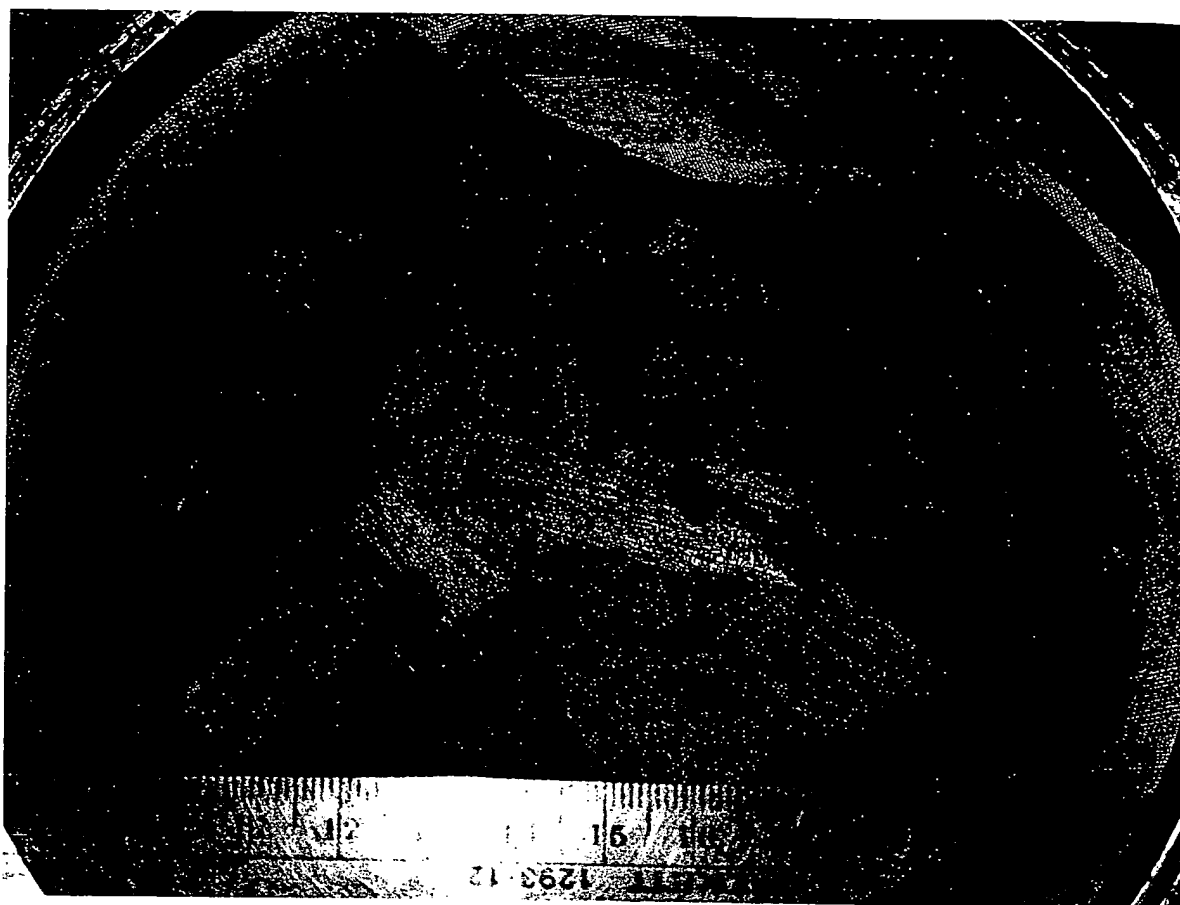


Figure 6. Southern pine chips in a chip basket after impregnation. Compare to Fig. 1.

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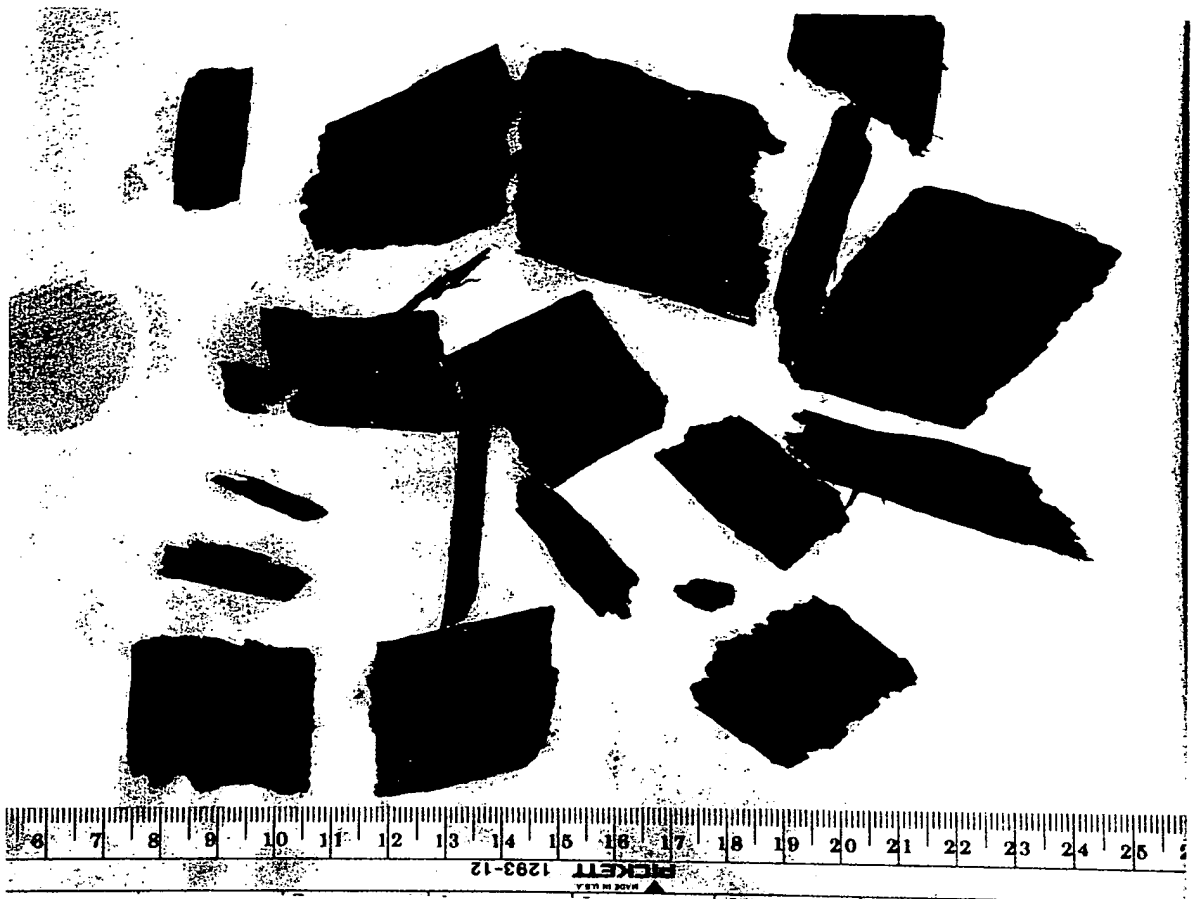


Figure 7. Southern pine chips after impregnation.

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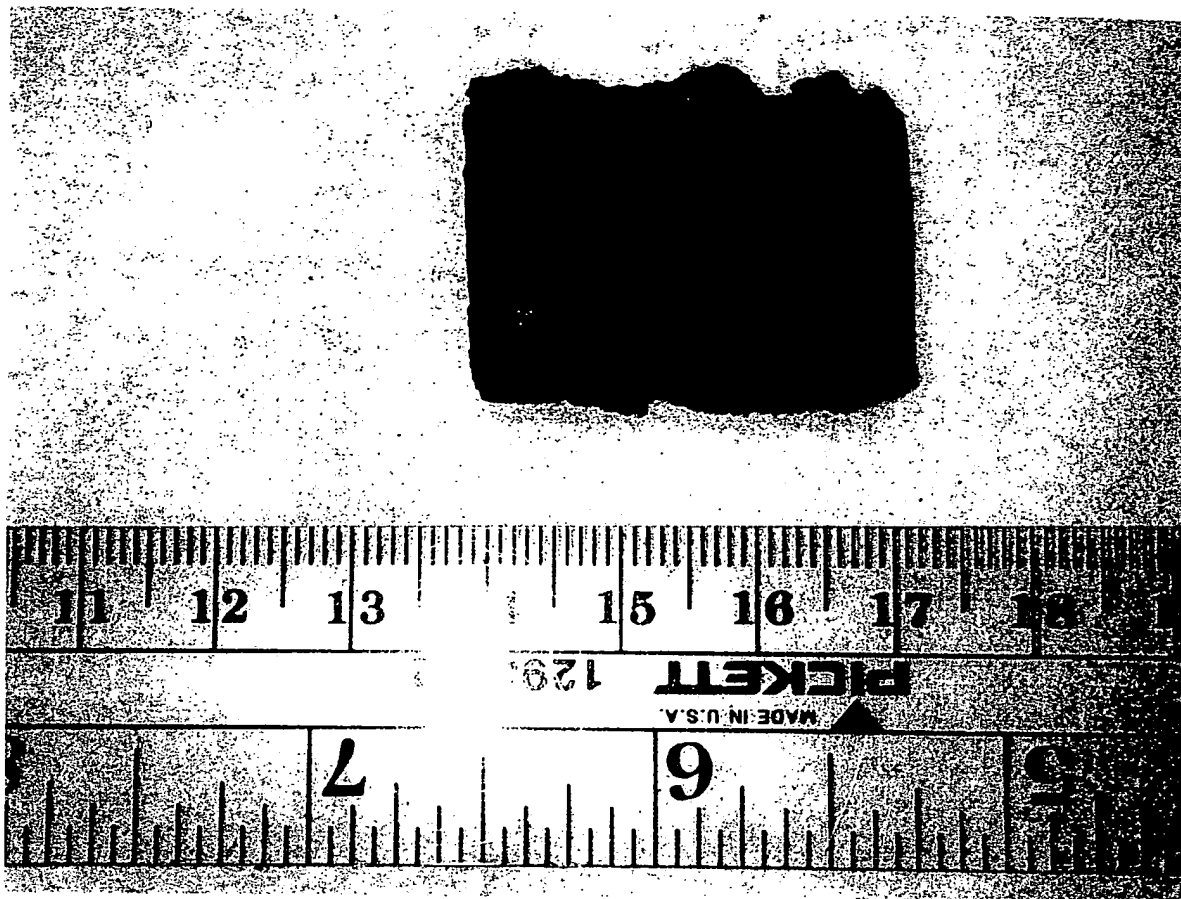


Figure 8. Single impregnated Southern pine chip.

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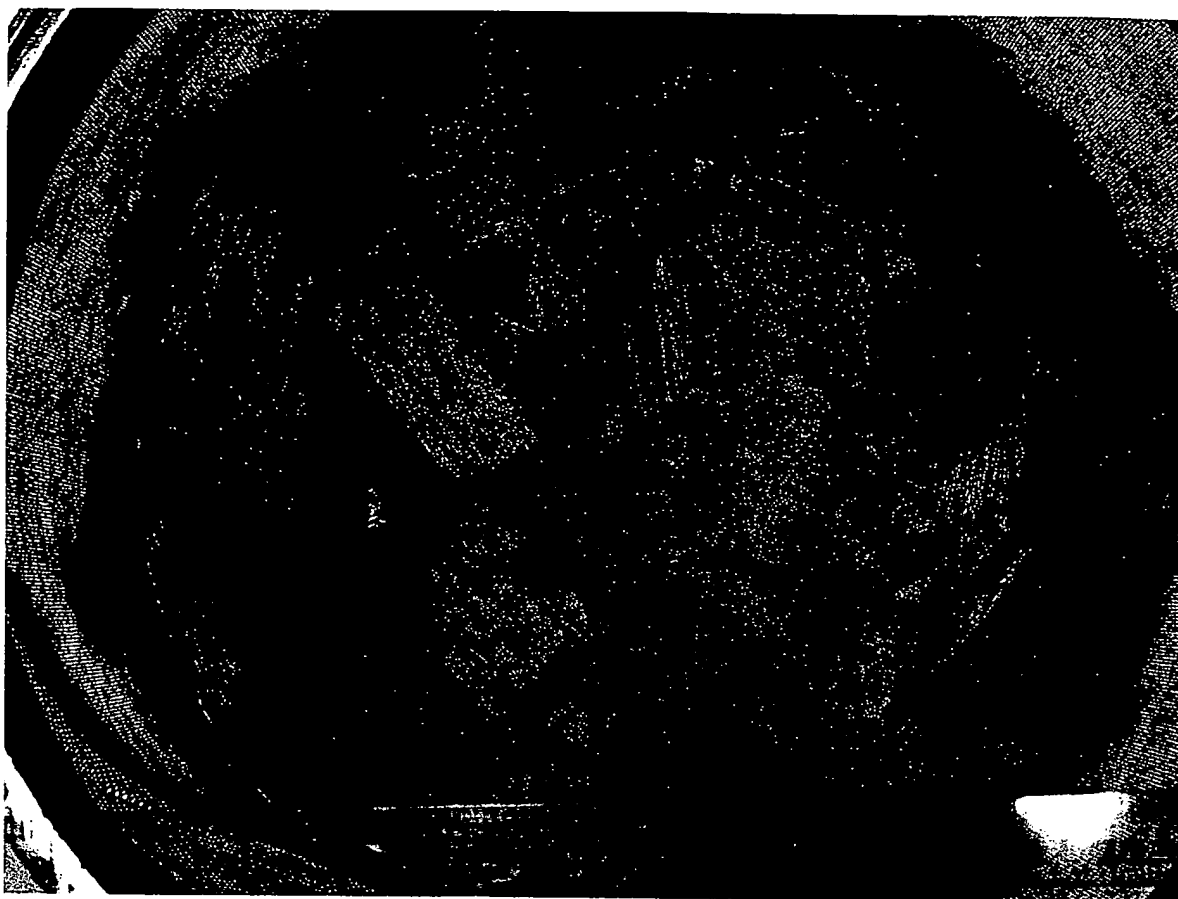


Figure 9. Southern pine chips in a chip basket mid-way through the cook zone. Compare to Fig. 2.

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Figure 10. Southern pine chips mid-way through the cook zone.

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Figure 11. A single Southern pine chip mid-way through the cook zone.

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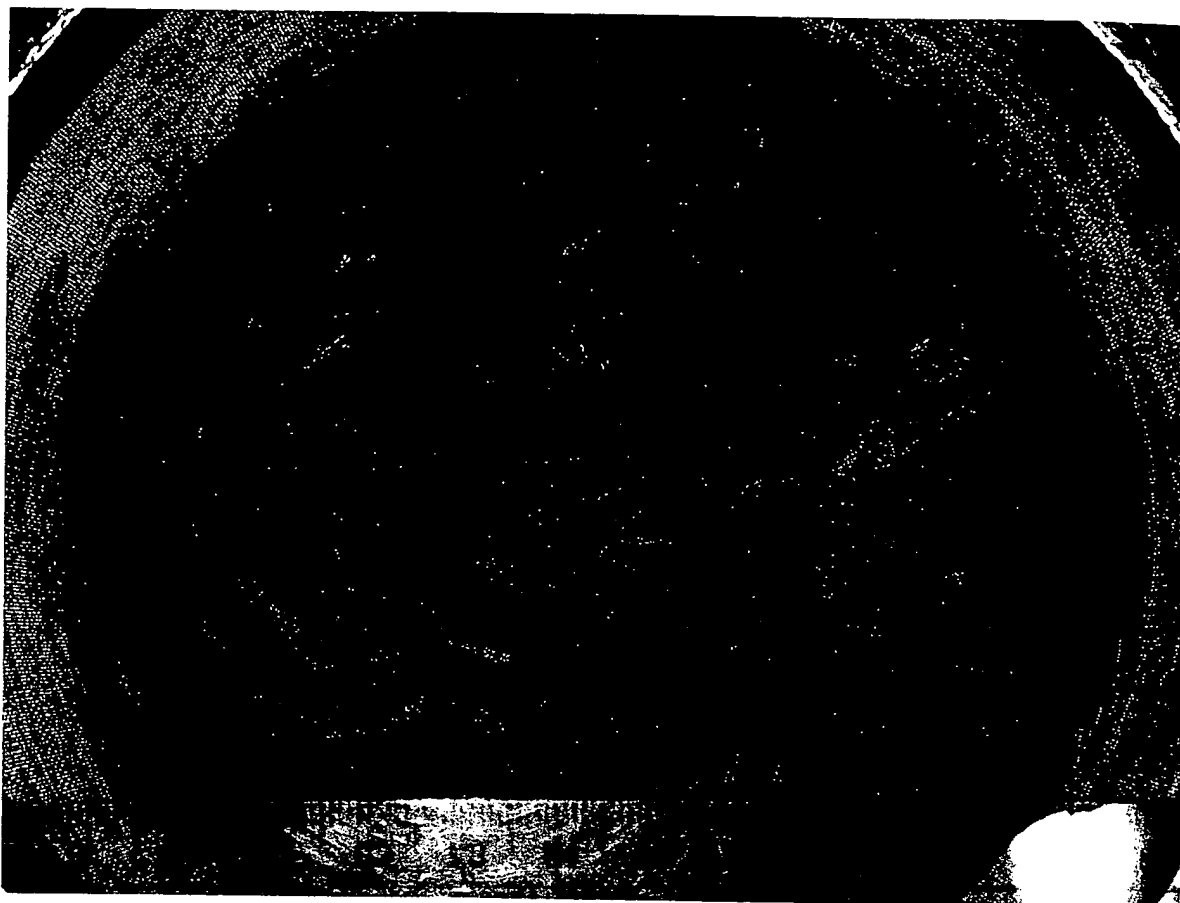


Figure 12. Southern pine chips in a chip basket at the end of cooking. Compare to Fig. 3.

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Figure 13. Southern pine chips at the end of the cook.

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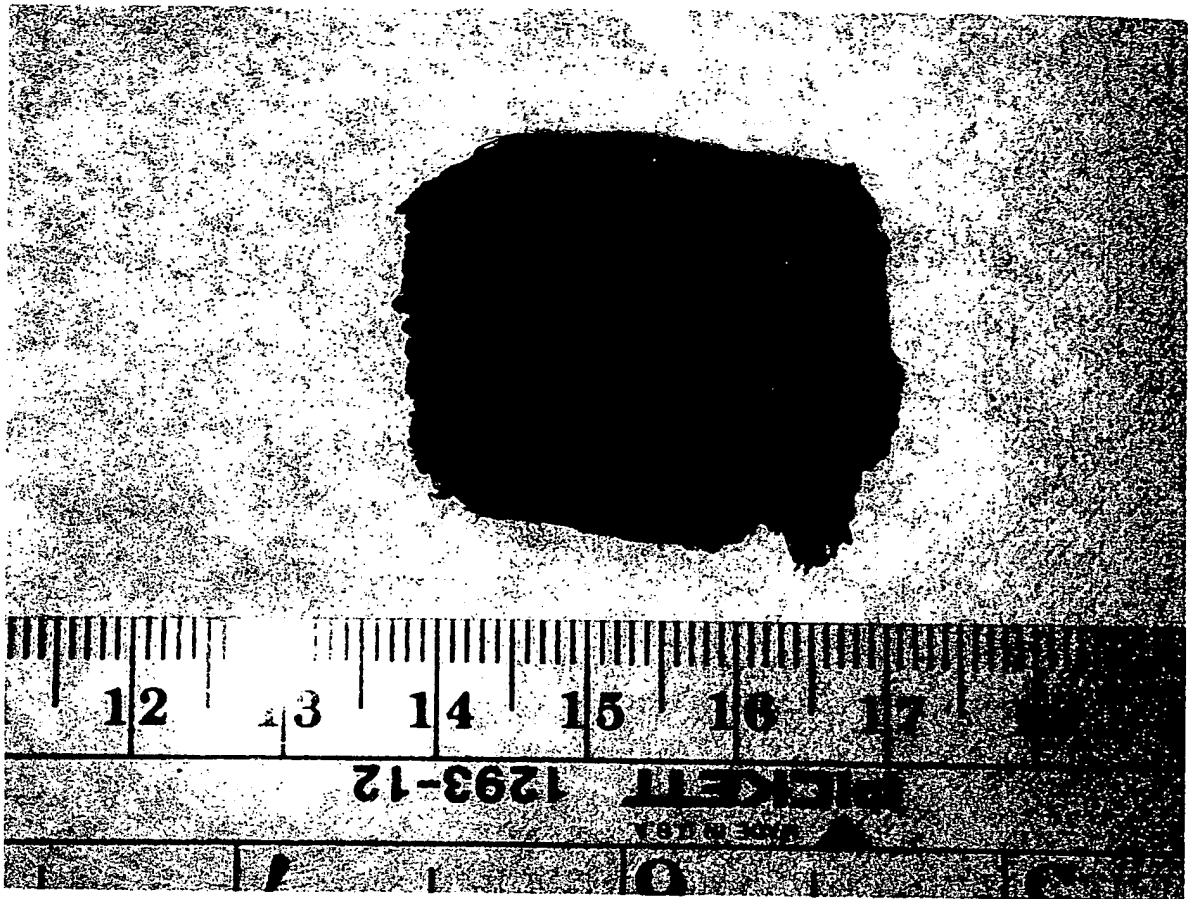


Figure 14. A single Southern pine chip at the end of the cook.

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Figure 15. Southern pine brownstock from chips (after agitation) removed mid-way through the cook.

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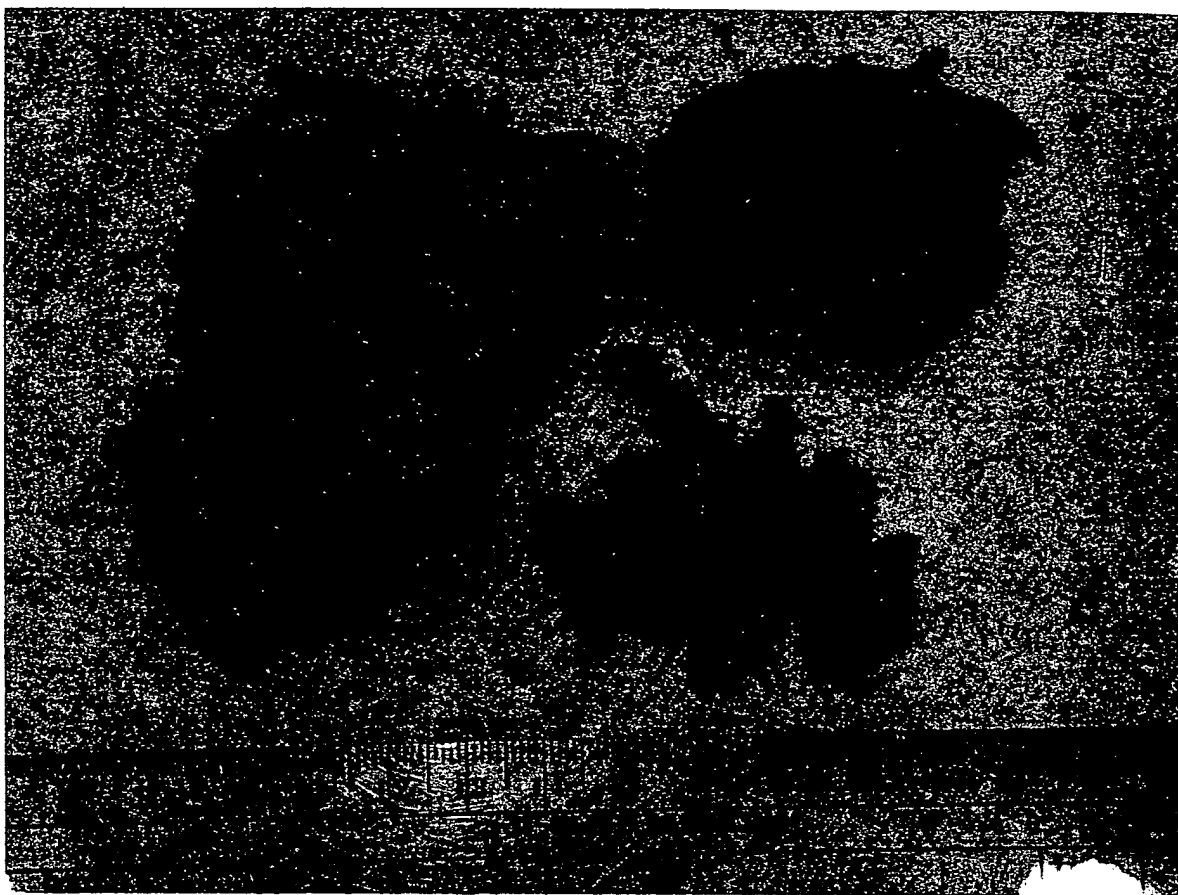


Figure 16. Southern pine brownstock from chips (after agitation) at the end of the cook.

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